

310604

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B. Tech. III Sem. (Main) Exam., Dec. - 2019

Common for EE/EEE

3EE3-04 Power Generation Process

Time: 2 Hours

Maximum Marks: 80

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 5×2 marks = 10 marks. All five questions are compulsory.

Part – B: Analytical/Problem Solving questions 4×10 marks = 40 marks. Candidates have to answer four questions out of six.

Part – C: Descriptive/Analytical/Problem Solving questions 2×15 marks = 30 marks. Candidates have to answer two questions out of three.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART - A

- Q.1 What is difference between chronological load curve and load duration curve? [2]
- Q.2 What is the effect of load factor on unit energy cost? [2]
- Q.3 What is 'spot pricing'? Discuss its significance. [2]
- Q.4 List the advantages of power factor improvement. [2]
- Q.5 What is tidal energy? How it can be used for power generation. [2]

PART - B

- Q.1 Discuss the role of instrumentation in thermal power plants. [10]
- Q.2 Explain the different ways of converting solar energy into electrical energy. [10]
- Q.3 Discuss the power factor improvement scheme using shunt capacitors for the following cases.
- (a) When kW demand is constant. [5]
- (b) When kVA demand is constant. [5]
- Q.4 A steam plant having an installed capacity of 200MW is to be set up. The investment on the plant is ₹ 29,000 per kW of installed capacity. The useful life of plant may be taken as 20 years and salvage value of plant is 25% of initial cost. Find the annual depreciation reserve by <http://www.mgsuonline.com>
- (a) Straight line method. [5]
- (b) Sinking fund method if interest rate is 7%. [5]
- Q.5 Find the power factor of a station supplying the following loads : 250 kW at unity power factor, 1500 kW at 0.9 lagging, 700 kW at 0.9 leading, 1000 kW at 0.8 lagging. Find the load at unity power factor which can be supplied by this sub – station. [10]
- Q.6 Discuss the following renewable energy sources with respect to Indian power generation. [4×2½=10]
- (a) Solar (b) Wind
- (c) Tidal (d) Geothermal

PART - C

- Q.1 Explain the principle of operation of open cycle and closed cycle gas turbine plants.
Comments upon efficiency with justification. [15]
- Q.2 Discuss in detail the key factors influencing power plant economics. [15]
- Q.3 A 3 - phase 100 kW synchronous motor and a 3 - phase 200 kW induction motor are connected in parallel to a 400 V system. Both motors are star connected. Induction motor is operating at a p.f. of 0.71 lagging. The resistance of synchronous motor is 0.1 ohm per phase and that of the cable, feeding both the motors, is 0.03 ohm per phase. Find power factor of the total load and copper losses in synchronous motor and copper losses in cable if the power factor of synchronous motor is - [5×3=15]
- (a) 1
(b) 0.8 leading
(c) 0.6 leading
(d) At what power factor are copper losses of synchronous motor minimum?
(e) At what power factor are total copper losses minimum?

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